

**Claims**

1. A data processing device for processing time-varying signals, comprising:  
input means for receiving a said time-varying signal;  
5        computing means for performing a plurality of neuron computations, to provide  
at least two layers of said neuron computations each comprising at least two parallel said  
neuron computations, the outputs of one such layer being fed forward to another;  
each said neuron computation comprising receiving a plurality of input signals,  
weighting each signal according to a predetermined weight value, and generating an  
10       output signal comprising a function of the weighted input signals; and  
output means for generating at least one output signal from said computing  
means, the or each output signal comprising a function of the or each input signal;  
characterised by:  
cyclical control signals associated with said neuron computations to indicate  
15       parts of a time cycle during which some of said neuron computations are inoperative;  
and  
time control means for applying said cyclical control signals to said neuron  
computations during operation of said computing means on said time-varying signals.  
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2. A device according to claim 1, further comprising at least one serial to parallel  
convertor associated with each said neuron computation so as to provide a plurality of  
parallel inputs to the neuron computation comprising differently-delayed versions of the  
25       same signal.
3. A device according to claim 2, further comprising a gating arrangement  
associated with each said serial to parallel convertor, said gating arrangement being  
controllable by a predetermined and updatable control word to specify which of the  
30       parallel outputs of the convertor comprise said plurality of parallel inputs to the neuron  
computation.
4. A device according to claim 1, comprising a programmable signal processing  
device programmed to perform said plurality of neuron computations on a signal.

5. A device according to claim 1, including an integrated circuit comprising a plurality of neuron computation devices operating to perform said neuron computations in parallel.

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6. A communications terminal device operable to communicate selectively over a communications channel in a plurality of different communications modes, comprising a data processing device for processing time-varying signals, said data processing device comprising:

- 10           input means for receiving a said time-varying signal;  
              computing means for performing a plurality of neuron computations, to provide at least two layers of said neuron computations each comprising at least two parallel said neuron computations, the outputs of one such layer being fed forward to another;  
              each said neuron computation comprising receiving a plurality of input signals,  
15           weighting each signal according to a predetermined weight value, and generating an output signal comprising a function of the weighted input signals; and  
              output means for generating at least one output signal from said computing means, the or each output signal comprising a function of the or each input signal; and  
              a neuron updating circuit arranged to supply different parameter values for use in  
20           said neuron computations, so as to change the communications mode from one said predetermined mode to another.

7. A device according to claim 6, in which the data processing device is according to claim 1.

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8. A device according to claim 6, operable to add a new communications mode by receiving new said parameter values via said communications channel.

9. A communications station for use in a system including a terminal according to claim 8, the station comprising means for transmitting a signal comprising new parameter values for neural computations, to add a new communications mode to said device.

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10. A communications system comprising a plurality of terminals each having a neural network therein which has parameter values enabling the network to emulate a transmission processing stage in a transmission mode, and a transmission station for sending new parameter values to the terminals to change the operation of the neural networks to emulate a new transmission mode.

11. A method of operating a communications system comprising a plurality of terminals, each terminal including a feed-forward computation network operating in accordance with a plurality of network parameter values, comprising adding a new transmission mode by sending new network parameter values to the terminals.